

AMENDMENTS TO THE CLAIMS

The following claims replace all prior versions and listings of claims in the application:

1. (Currently Amended) A method for defining tone signals in a voice activity detection (VAD) device, comprising:

defining a threshold for zero amplitude change by determining, for a signal with a zero value amplitude at a zero crossing point, a tangent value of the signal, and by defining the zero value amplitude as a non-zero value depending upon the tangent of said signal at the zero crossing point;

calculating a zero crossing rate of a signal;

extracting a set of parameters from a plurality of duration periods of said signal;

calculating a maximum difference between said plurality of duration periods; ~~and~~

comparing said maximum difference with said threshold; and

declaring a sample of the signal as containing a tone when the maximum difference is not greater than the threshold.

2. (cancelled)

3. (Currently Amended) The method of claim [[2]] 1, wherein said defining comprises defining said zero value amplitude according to whether said tangent is positive or negative.
4. (Currently Amended) ~~The method of claim 1, further~~ A method for defining tone signals in a voice activity detection (VAD) device, comprising:
defining a threshold for zero amplitude change of a signal;
where a portion of said signal does not contain a zero crossing point,
defining a range of said signal that contains a zero crossing point;
extracting a set of parameters from a plurality of duration periods of said range of said signal;
calculating a maximum difference between said plurality of duration periods in said range; and
comparing said maximum difference of said range with said threshold; and
declaring a sample of the signal as containing a tone when the maximum difference is not greater than the threshold.
5. (Previously Presented) The method of claim 1, wherein the maximum difference is calculated between a sum of all said durations and a single said duration.

6. (Previously Presented) The method of claim 1, wherein the maximum difference is calculated using a mean difference between a sum of all said durations and a single duration.

7. (Previously Presented) The method of claim 1, wherein the method defines tone signals according to an International Telecommunications Union (ITU) recommendation G.729 Annex B VAD device.

8. (Previously Presented) The method of claim 1, wherein said calculating said maximum difference comprises calculating a product between the sample and the sample's adjacent sample in a group of signal samples.

9. (Currently Amended) A device for defining tone signals for voice activity detection (VAD), comprising:

a processor that is programmed to:

define a threshold for zero amplitude change by determining, for a signal with a zero value amplitude at a zero crossing point, a tangent value of the signal, and by defining the zero value amplitude as a non-zero value depending upon the tangent of said signal at the zero crossing point;;

calculate a zero crossing rate of a signal;

extract a set of parameters from a plurality of duration periods of said signal;

calculate a maximum difference between said plurality of duration periods; and
compare said maximum difference with said threshold and;
declare a sample of the signal as containing one of a tone, modulated tone, and
saturated tone when the maximum difference is not greater than the threshold.

10. (Cancelled)

11. (Currently Amended) The ~~system~~ device of claim 10, wherein said processor
defining comprises defining said zero value amplitude according to whether said tangent
is positive or negative.

12. (Currently Amended) The ~~system~~ device of claim 9, further comprising:
where a portion of said signal does not contain a zero crossing point,
said processor defines a range of said signal that contains a zero crossing point;
extracts a set of parameters from a plurality of duration periods of said range;
calculates a maximum difference between said plurality of duration periods in said
range; and
compares said maximum difference of said range with said threshold.

13. (Currently Amended) The ~~system~~ device of claim 9, wherein the maximum
difference is calculated by the processor between a sum of all said durations and a

single said duration.

14. (Currently Amended) The ~~system~~ device of claim 9, wherein the maximum difference is calculated by the processor using a mean difference between a sum of all said durations and a single duration.

15. (Currently Amended) The ~~system~~ device of claim 9, wherein the device defines tone signals according to an International Telecommunications Union (ITU) recommendation G.729 Annex B VAD recommendation.

16. (Currently Amended) The ~~system~~ device of claim 9, wherein the processor calculates the maximum difference includes calculating a product between the sample and the sample's adjacent sample in a group of signal samples.

17. (New) The method of claim 1, wherein the calculating the zero crossing rate comprises:

analyzing the sample to determine if an amplitude of a signal sample is zero at a zero crossing point;

when the amplitude is zero at the zero crossing point, determining a tangent of a signal wave of the signal sample at the zero crossing point;

changing the signal amplitude from zero to negative one if the tangent is negative;

and

changing the signal amplitude from zero to positive one if the tangent is positive.

18 (New) The method of claim 1, wherein the declaring the sample comprises declaring the sample as containing a voice tone received in the VAD device.

19. (New) The method of claim 4, wherein the defining the threshold for zero amplitude change comprises determining, for a signal sample with a zero value amplitude at the zero crossing point, a tangent value of the sample, and defining the zero value amplitude as a non-zero value depending upon the tangent of said sample point, and

calculating a zero crossing rate of the signal using the tangent value of the sample.

20. (New) The device of claim 9, wherein the processor is further programmed to define a threshold for zero amplitude change by:

analyzing the sample to determine if an amplitude of a signal sample is zero at a zero crossing point;

when the amplitude is zero at the zero crossing point, determining a tangent of a signal wave of the signal sample at the zero crossing point;

changing the signal amplitude from zero to negative one if the tangent is negative;

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and

changing the signal amplitude from zero to positive one if the tangent is positive.